BIOLOGICAL RESEARCH COLLECTIONS (BRC)

Program Announcement

DIRECTORATE FOR BIOLOGICAL SCIENCES
DIVISION OF BIOLOGICAL INFRASTRUCTURE

Deadline for Receipt of Proposals: ***First Friday in September Annually***
Deadline for Supplement Requests: ***First Friday in February Annually***

NATIONAL SCIENCE FOUNDATION

Biological Research Collections

PURPOSE

Collections of both extant and fossil organisms, their tissues and artifacts are critical resources for research in many scientific disciplines. These collections are the basis for our understanding of the diversity and evolution of life on Earth, and they are essential for the training of the systematists, ecologists, soil biologists, population biologists, paleobiologists, geneticists and many other scientists who increase this understanding. Institutions that house and maintain such collections assure the preservation of the specimens and the growth of the collections. They also provide access to the specimens and the information associated with them in order to document biological diversity and promote research by present and future generations of scientists. Recognizing the critical roles of such collections, the Biological Research Collections (BRC) program provides support for collection improvement, for collection computerization, for research to develop better techniques of curation and collection management, and for collections community-based development undertakings. The BRC program also provides limited supplemental support for the participation of college undergraduates and high school students in research-oriented collections activities through supplements to existing awards.

Pending the continued availability of funds, the BRC program expects to make as many as forty awards annually over all award categories.

WHO MAY SUBMIT

Proposals are accepted from U.S. institutions, including colleges and universities that maintain research collections, natural history museums including herbaria, and other collections administered by independent organizations or by state, county, or local governments; non-federal and non-profit research organizations that maintain collections; and botanical gardens, zoological parks, and aquaria that maintain research collections that document biological diversity (see GPG, Chapter I. Section C).

"Voucher" collections, such as those maintained by some academic departments, field stations, and marine laboratories are eligible if it is shown that use profiles of the collections justify the investment and curatorial support is adequate. Supportable projects include those that deal directly with specimens of organisms, parts of organisms, or direct artifacts of organisms (e.g., recorded sounds, fossilized footprints). Also eligible are organism-based collections that maintain associated specimens and data documenting the environmental context of the primary organism (e.g.

soil and water samples, temperature and precipitation records, specimen-based geographic information). Projects to computerize card files of observational records or literature sources (that is, the computerization of existing card files of literature sources, observation records, or other library items) are not eligible for support.

PROPOSAL CATEGORIES

The BRC program provides support in the categories detailed below: collection improvement, collection computerization, research on curatorial and collection management techniques, and community-based development activities. A proposal may request support for a research collection that is circumscribed taxonomically (e.g., mammals, insects, plants, fungi), curatorially (e.g., a vertebrate osteology or tissue collection, pollen slides, collections of bird or frog calls, MR images of dinosaur bones, alcohol-preserved invertebrates), or in limited cases geographically (e.g. particularly for site-based voucher collections). In either case, projects should be designed so that the most reasonable economy of scale and cost- and time-efficiency can be achieved.

Supplements are also provided to underwrite the involvement of undergraduate and high school students in collections-based research. Applicants are strongly encouraged to consult with the Program Director prior to preparing a proposal to the BRC program.

Proposals for Collection Improvement

Research collections that are actively growing and regularly used may require periodic support for physical and curatorial improvements to keep pace with this growth and to enhance access and research use. Physical improvements typically involve rehousing a collection, replacing inadequate resources, providing new resources for continued growth, or incorporating one or more collections donated by another institution or individual. Physical rehousing efforts that incorporate computerization, and thereby eliminate excessive handling of the specimens, are encouraged. Allowable costs generally include the purchase and installation of new storage systems (e.g., cases, compactors or compactorized cases, liquid nitrogen or ultracold freezers), the purchase of curatorial materials (e.g., acid-free foam or paper, drawers, trays, boxes), as well as ***new*** curatorial and technical assistance specifically designed to effect the proposed improvements for the duration of the proposed project.

Proposals for Collection Computerization

Computerization and sharing of collection data promote the broad use of collections information in

research and education throughout the biological, geological, and environmental sciences, as well as enhancing collection management. Computerization involves the digital capture of specimen records in a quality-controlled manner, the networked linking of collection databases with each other, and the integration of specimen databases with other electronic information resources. Allowable costs generally include the equipment (hardware, software) and supplies (storage media), as well as salary for ***new*** personnel specifically required to complete a scientifically sound and well-circumscribed project. It is expected that such projects will lead to improved, direct user access to collection data via standard Internet protocols.

Proposals for Curatorial and Management Techniques Research

Proposals for curatorial research should seek to improve curation methods or archival practices. Proposals for collection management improvement should be aimed at increasing efficiency of collection management (e.g. data entry, verification, and access, accession and de-accession, processing loans, georeferencing). Both types of proposals should seek to broaden the utility and accessibility of collection materials and data to the array of scientific disciplines that might use them. Awards for these purposes are limited to no more than $50,000 of NSF support per project.

Proposals for Community-Based Development Activities and Small Grants for Exploratory Research **(SGER)**

Community-based proposals for conferences, symposia, and workshops are encouraged by the program, especially when designed to address particularly forward-looking topics such as standards for curatorial procedures, database development, data sharing protocols, or other broadly based developmental issues (see GPG, Chapter I. Section C). The *GPG* is available on the NSF OnLine Document System located at the URL http://www.nsf.gov/. Small Grants for Exploratory Research (SGER) involving exploratory, high risk endeavors are also encouraged (see *GPG*, Chapter II). Although both of these types of proposals are accepted at any time, investigators are encouraged to contact the program director for discussion before preparing and submitting such proposals.

Supplements for Collections Research Experience for Students

Use current guidelines for *Research Experiences for Undergraduates (REU),* NSF 96-102 and *Research Assistantships for Minority High School Students (RAMHSS),* NSF 89-39 to prepare supplemental requests. The BRC program must receive these types of supplemental requests by the first Friday of February of each

year. The BRC program director should be consulted before preparing or submitting the request.

******Special Note******

The BRC program wishes specifically to encourage efforts in all the categories above, either as separate proposals or as elements of broader proposals to BRC, aimed at making collections more relevant to and usable by a wide array of scientists (e.g., ecologists, population biologists, geneticists, molecular and cell biologists, physiologists, and paleontologists in addition to systematists) and the general public.

PROPOSAL CONTENT

Proposals for collection improvement and collection computerization must present convincing evidence of the collection's importance for research on a regional, national, or international scale, the need for and anticipated impact of the project, and a detailed management plan for timely completion of the project. All proposals must include a description of the collection's policies, protocols and user charges or fees that govern acquisitions, loans, and access to the specimens and the Internet-based availability of the information associated with them.

All submitting organizations must demonstrate their commitment to collection staffing and normal operating support that are adequate for the regular use, growth, care, and management of the collection. Staffing should be commensurate with the size and activity level of a collection and normally comprises at least one curator and one support person (curatorial assistant or collection manager). Normal collection operations include specimen acquisition resulting from the research activities of the collection's curators and other associated staff or from the acceptance of donated materials, maintenance of those collections, answering loan and data requests, pursuing specimen-based research, and accommodating visiting researchers. Support from the BRC Program may ***not*** be requested to defray these ordinary operating costs.

Support provided by the BRC program is restricted to the personnel, equipment, supplies and travel associated with collection improvement, computerization, curatorial research, or community-based developmental activities that are over and above the financial capabilities of the collection, based on the normal operating expenses received from the institution. Projects proposed for BRC support should be clearly focused, have a strong scientific rationale, and be designed to be completed within the time-frame proposed. BRC does not support the acquisition of specimens through purchase, nor does it fund collecting expeditions nor the

improvement of libraries or archives. Building renovation associated with collection improvement will not be supported by BRC, but may be provided by the submitting organization as a demonstration of institutional commitment. Only one proposal may be submitted to any one round of the BRC competition by any single collection. Institutions that house multiple collections should engage in planning activities internal to the institution in order to prioritize the needs of the several collections such that the institution does not submit a multiplicity of proposals to any one BRC competition.

BUDGETS

Requests for BRC support should not exceed $500,000; average award size is approximately $150,000. Curatorial and management techniques research awards will not exceed $50,000. Conference, symposium, and workshop proposals should not normally exceed $25,000. Small Grants for Exploratory Research (SGER) may not exceed $100,000. Supplements for student involvement should follow current guidelines for those activities. Provide justification for requested items as outlined in the "Budget Justification" section. Address budget questions directly to the program director. The annual program budget is approximately $6M pending availability of funds.

PROPOSAL FORMAT

Proposals to BRC **require** electronic submission via the NSF FastLane system in accordance with the guidelines provided in the "Instructions for Proposal Preparation" found in the *Grant Proposal Guide (*see GPG, Chapter I, Section C). The *GPG* is available on the NSF Web Site at the URL http://www.nsf.gov/. Include in proposals to BRC the components listed in *GPG*, Chapter II, Section D. State information in each component as clearly and concisely as possible for merit review. Guidelines are provided for specific sections as follows:

Project Summary (maximum: one page)

Summarize the proposed collection improvement, computerization, techniques research, or other activity and its impact on the use of the collection and its information resources by science and other sectors of society, long-term management, and public outreach capabilities of the collection.

Project Description (maximum: 15 single-spaced text-pages, inclusive of tables and illustrations)

1. *Results from Prior NSF Support* (maximum: 5 of the 15 pages of text): Summarize the results of the most recent collection improvement award that the collection has received from NSF in the preceding

5 years, even if the current Principle Investigator (PI) was not associated with the collection at that time. If the collection has not received an award in the previous 5 years, then a previous award to the PI within the past 5 years that was not collection-related but that is most closely allied to the current proposal should be described.

2. *Collection Significance and Use*: The need for and impact of the project may depend, in large part, on the scientific significance of the particular collection and the extent of its use. Describe the collection's place relative to other similar collections, and specify the nature and degree of overlap with those collections. Provide the following supporting data in concise tabular format:

(a) size, composition, and areas of taxonomic, geographic and/or geologic concentration;
(b) rate of growth over the past five years;
(c) degree and range of use in research, education and other activities over the past five years (e.g. number and type of loans, number of visitors, data requests and other pertinent statistics, arranged according to professional or student use);
(d) research impact over the past five years (e.g., tabulate the number of publications or other products, arranged by professional or student, that are based on specimens in the collection, and provide up to five particularly significant examples).

3. *Normal Collection Operations*: Describe the current collection staff and the percentage of staff time devoted to normal collection operations (e.g., specimen acquisition, curation and maintenance; loan and visitor traffic; data requests), using tables as appropriate. These data should build upon the collection significance and use data presented in the preceding section. Data must clearly demonstrate that the tasks of the project are new and beyond what current staff can handle, in order to justify the personnel requested.

The Program expects that institutional support for collection staff and materials is adequate to maintain current and projected normal operations. Each collection should normally have at least one curator and one support person (curatorial assistant or collection manager) supported by the institution. If current institutional support does not meet this expectation, this section should present a plan for bringing the size of the permanent collection staff into balance with the realistic operating needs of the collection.

Include relevant letters of commitment from the institution as outlined in the *"Special Information and Supplementary Documentation"* section.

4. *Need for the Project:* Describe the planned project, the particular part of the collection that would be

affected, and the need for the proposed collection improvement or collection computerization activity. Outline the potential for lost research opportunities and the deleterious effects on the collection that stem from current conditions. Also, describe how the current project is related to past and future collection projects and how it fits within a long-range plan.

5. *Project Design and Management*: Describe the rationale, design and implementation of the project activities, specifying the personnel, equipment, operations, and timetable for the proposed effort (use tables as appropriate). If additional personnel are requested, base the justification on real, timed, discrete task analyses (e.g., preparing a specimen, capturing or verifying data records, etc.).

Collection improvement projects that intend to move or rehouse entire collections or install major storage systems should also provide floor plans, floor loading analyses and appropriate technical drawings in the "Special Information and Supplementary Documentation" section. Present evidence that multiple bids were sought for major equipment items and include the reasons for choosing a particular vendor in the "Budget Justification" section.

Proposals to integrate a large, donated collection into an existing collection should demonstrate that the relinquishing institution recognizes its responsibility to contribute (monetarily or in kind) to the move, and, if possible, to the future upkeep of the collection. Also, clearly describe a sound, scientific rationale for incorporating the particular collection, providing evidence that the addition will strengthen the existing collection either taxonomically or geographically.

Collection computerization proposals to BRC are for projects to populate a database with specimen data, and should present strong evidence of awareness of community information management standards and standard computerization approaches, current database applications in the discipline, and network access methods. Describe in the proposal the reasons that a particular software application (e.g. MUSE, ZOE, OZ, Biota, SMASCH, or other system) has been chosen, and quantitatively document that the chosen application allows rapid and efficient data entry. Describe the scientific rationale for computerizing the particular collection or portion of the collection such that reviewers can evaluate the contribution that the project would make to the biological knowledge base (i.e., why this collection and not another?). The Program expects that all data entered during a BRC-supported project will expeditiously be made readily and easily available over the World Wide Web during the course of the project for use by other

researchers and the general public. The only exception to this expectation pertains to sensitive taxa. In those cases, specifically justify the exceptions in the proposal. Proposals to develop new database applications or other software tools to manage or use collections data, and that could serve a broad cross-section of the community may be most appropriate to the Database Activities Program or Computational Biology Activities Program, and should conform to those program guidelines. Descriptions of those programs can be found on the Directorate for Biological Sciences web site located at http://www.nsf.gov/bio/.

In technique development proposals describe the need for a new curatorial or management technique or approach, why existing methods are inadequate, and outline proposed methodologies so that the chances of success can be evaluated.

In community-based development proposals describe the need for additional attention in a particular area, the strategies that will be employed during the sessions or workshop, and the expected product. The Program expects that a publication (electronic only or electronic and print) that describes community standards for curation, computerization, or other appropriate topic will result. Insofar as it is reasonable and applicable, technique and development proposals should adhere to these content and format guidelines.

6. *Impact of the Project:* Describe the anticipated impact of the proposed project on the use of collections in research, education, and public service, as well as on the long-term management of the collection. Document the tangible benefits to the user community, especially new research and educational opportunities that would ensue from the project. Explain the impact of a new curatorial technique on collections, and the importance of the improvement to long-term collections conservation.

7. *Dissemination of Results:* Describe the plans for advising the biological research community and the general public of the avenues of access to a collection and its associated data, publication of a technique, or the outcome of discipline-wide workshops.

8. *Special Information and Supplementary Documentation:* Include a digest of the collection's policies, protocols and user charges or fees that govern acquisition of specimens, access to and loan of specimens and tissues, destructive sampling, and access to and dissemination of collection data by electronic and / or other means. Collection projects should include documentation (i.e., floor plans, loading analyses, and technical drawings) as described in item 5, *"Project Design and Management,"*

above. The Program expects that all data from any NSF-supported collection computerization project will be expeditiously made accessible on the World Wide Web (with the exception of precise locality data for documentably sensitive taxa), as data are acquired during the course of the project.

Mail relevant letters of commitment from the institution, floor plans, and technical drawings, as applicable, directly to the Biological Research Collections Program. See mailing instructions in the Proposal Submission section.

Budget Justification

Provide a cost-breakdown and narrative justification for budgeted items. At least three vendor quotes for items of equipment and supplies that total more than $10,000 should have been obtained. Justify the vendor choice in this section. Present discrete task analyses to justify the number, duration and percent effort of current personnel, and for those additional personnel specifically required for the duration of the proposed project.

PROPOSAL SUBMISSION

The **deadline** for **submitting** proposals to Biological Research Collections (BRC) is **5:00 p.m. ET on the First Friday in September, annually**. Proposals for this solicitation **require** electronic submission using the NSF FastLane.

To access FastLane, go to the NSF Web Site at the URL http://www.nsf.gov, then select "FastLane" or go directly to the FastLane Homepage located at http://www.fastlane.nsf.gov/. For instructions on preparing and submitting a proposal using FastLane see *Instructions for Preparing and Submitting a Proposal to the NSF Directorate for Biological Sciences* found at http://www.fastlane.nsf.gov/a1/BioInstr.htm. Additionally, read the *PI Tipsheet for Proposal Preparation* and the *Frequently Asked Questions About FastLane Proposal Preparation* located at http://www.fastlane.nsf.gov/a1/A1Prep.htm.

Send the following materials to the Biological Research Collections Program to be received no later than five (5) business days after the proposal submission deadline:

- A paper copy of the cover sheet signed by the PI and an authorized institutional representative, including the certification page (page 2 of 2);
- The BIO classification form;
- Letters of commitment from the institution and applicable floor plans, loading analyses, and technical drawings as outlined in the *"Special Information and Supplementary Documentation"* section.

Mail the materials to:

Biological Research Collections
Program; NSF 98-126
Division of Biological Infrastructure,
Room 615
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

Do not mail copies of the proposal. NSF will make the appropriate number of copies of the proposal.

PROPOSAL REVIEW

Proposals to BRC are reviewed by experts in the particular field represented by the project. Proposals received after the deadline will not be reviewed. Proposals to Biological Research Collections are reviewed in accordance with NSF merit review criteria as outlined in the *GPG* (see GPG, Chapter I. Section C).

1. What is the intellectual merit and quality of the proposed activity?

How important is the proposed activity to maintaining collections as a resource for advancing knowledge and understanding within and across different fields of biological science? How well qualified is the proposer to conduct the project? To what extent does the proposed activity suggest and explore creative and original solutions to curatorial challenges? How well conceived and organized is the proposed activity?

2. What are the broader impacts of the proposed activity?

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to broaden the use of the collections resources of the country? What may be the benefits of the proposed activity to society?

Applicants are encouraged to suggest names of possible reviewers, including complete contact information and a brief description of the individual's expertise, in a letter or e-mail to the Program Director (see "Contact Information" section below).

AWARD ADMINISTRATION

Awards made as a result of this document are administered in accordance with the terms and conditions of *NSF GC-1, "Grant General Conditions"* or *FDP-III, "Federal Demonstration Project General Terms and Conditions,"* depending on the grantee organization. Copies of these documents are available at no

cost from the NSF Clearinghouse, P.O. Box 218, Jessup, MD 20794-0218, phone (301) 947-2722, or via e-mail at pubs@nsf.gov. More comprehensive information is contained in the NSF *Grant Policy Manual (GPM)*, NSF 95-26, for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, D.C. 20402. The telephone number at GPO is (202) 783-3238 for subscription information. The *GPM* is also be available on the NSF OnLine document system located at the http://www.nsf.gov/.

If the submitting institution has never received an NSF award, it is recommended that appropriate administrative officials become familiar with the policies and procedures in the *Grant Policy Manual* that are applicable to most NSF awards. If a proposal is recommended for an award, the NSF Division of Grants and Agreements will request certain organizational, management, and financial information. These requirements are described in Chapter III of the *Grant Policy Manual*.

STUDENT RESEARCH EXPERIENCES SUPPLEMENTS

Organizations with active BRC awards are invited to submit requests for supplemental support that will broaden the research and educational impact of the project. NSF announcements about these supplements may be obtained from the Documents Online system at http://www.nsf.gov/.

High School Students

Institutions that house collections, particularly those located in large urban centers, have the opportunity to improve science education in all areas of biology. Organizations with active collection awards are encouraged to make contact with local high schools and engage one or more biology teachers as summer curatorial associates and several students as curatorial assistants. Most of the students chosen should be from minority or at-risk groups. In addition to being trained and employed in the project's curatorial and research activities, the students and their teachers may receive training as docent, curatorial and research assistants in order to improve their understanding of biological science and foster the students' interest in collection- based scientific careers. Supplements can be requested for summer salary support for the students and teachers, their supplies, training by curatorial staff members, and the equipment to be used. Applicants should follow the currently applicable guidelines for *Research Assistantships for Minority High School Students,* NSF 89-39.

Undergraduate Students

Institutions that house collections have the opportunity to improve scientific research and education in all areas of biology by recruiting

undergraduate students to work in the collections on BRC-related research projects. Supplements can be requested for student stipends as described in the "REU Supplements" section of the currently applicable *Research Experiences for Undergraduates (REU),* NSF96-102 guidelines.

CONTACT INFORMATION

Direct inquiries about the BRC program or these guidelines, and questions about prospective proposals to:

Larry M. Page
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Biotic Surveys & Inventories
Biological Research Collections (BRC)
Division of Biological Infrastructure
National Science Foudation
4102 Wilson Blvd., Suite 635
Arlington, VA 22230
ph: 703-292-7190
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General Information

The Foundation provides awards for research in the sciences and engineering. The awardee is wholly responsible for the conduct of such research and preparation of the results for publication. The Foundation, therefore, does not assume responsibility for the research findings or their interpretation.

The Foundation welcomes proposals from all qualified scientists and engineers and strongly encourages women, minorities, and persons with disabilities to compete fully in any of the research related programs described here. In accordance with federal statutes, regulations, and NSF policies, no person on grounds of race, color, age, sex, national origin, or disability shall be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity receiving financial assistance from the National Science Foundation.

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF projects. See the program announcement or contact the program coordinator at (703) 306-1636.

Privacy Act. The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the application review process; to applicant institutions/grantees to provide or obtain data regarding the application review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998

Public Burden. Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of your receiving an award.

The public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Gail A. McHenry, Reports Clearance Officer, Information Dissemination Branch, National Science Foundation, 4201 Wilson Boulevard, Suite 245, Arlington, VA 22230.

The National Science Foundation has TDD (Telephonic Device for the Deaf) capability, which enables individuals with hearing impairment to communicate with the Foundation about NSF programs, employment, or general information. To access NSF TDD, dial (703) 306-0090; for FIRS, 1-800-877-8339.

The program described in this announcement is in the category 47.074 (BIO) of the Catalog of Federal Domestic Assistance.

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